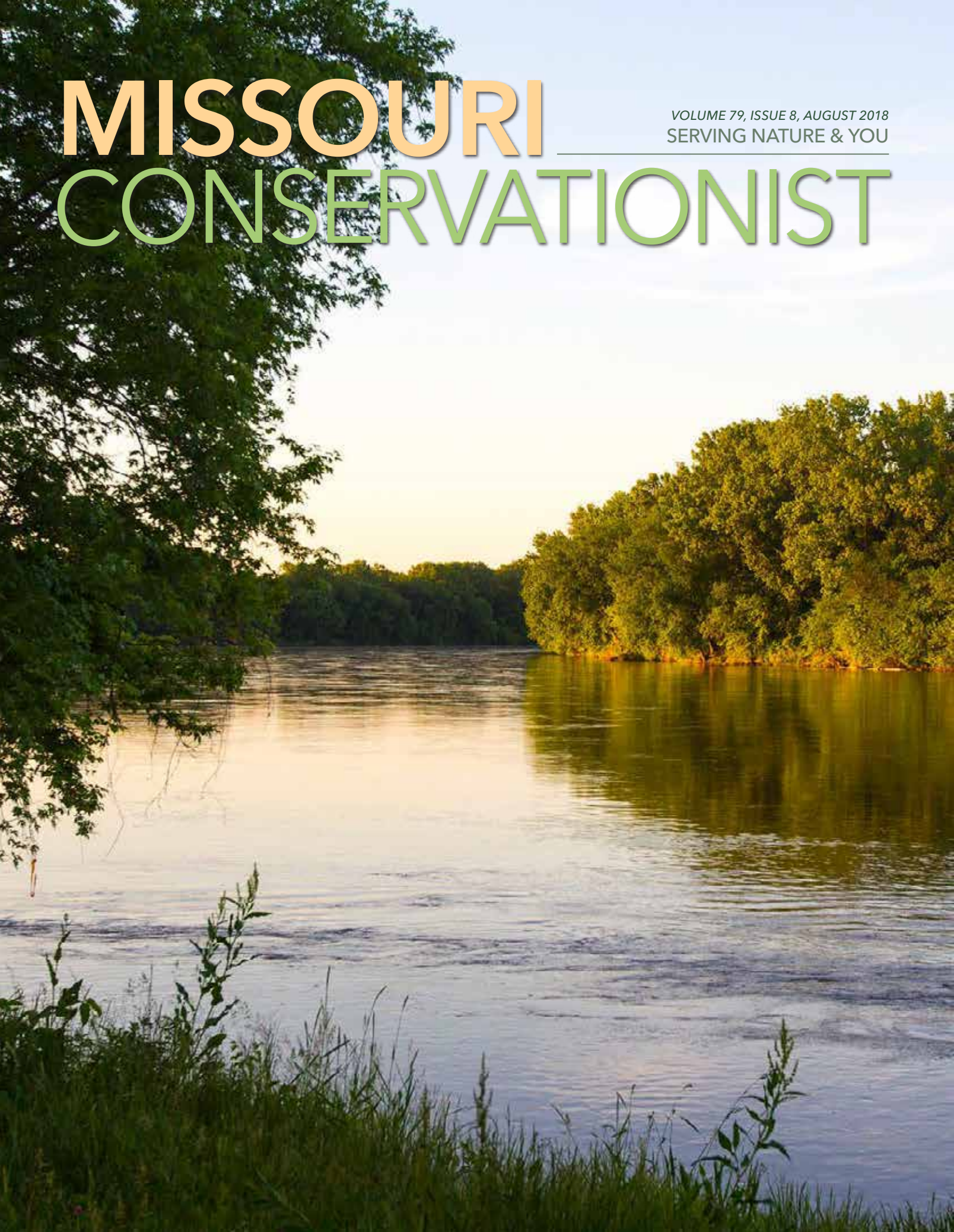


MISSOURI CONSERVATIONIST

VOLUME 79, ISSUE 8, AUGUST 2018
SERVING NATURE & YOU



HIKED IT... LIKED IT!

Hiking is a great way to get out and **discover nature**. It's good for your health, and it can be enjoyed by people of all ages and ability levels.

HOW TO PREPARE

- 👉 Wear comfortable shoes
- 👉 Plan to layer your clothing
- 👉 Pack water and a light snack

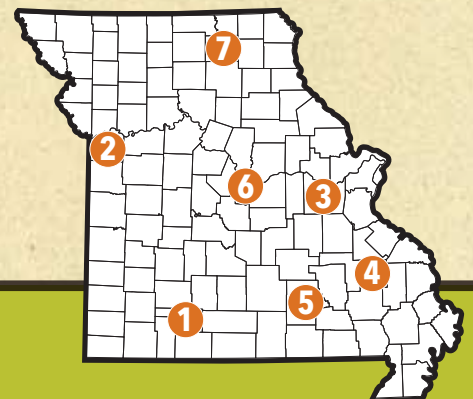
BRING

- 👉 Camera and binoculars
- 👉 Guides to identify birds, tracks, and wildflowers
- 👉 Family and friends



CHECK OUT HIKING OPPORTUNITIES AT THESE CONSERVATION AREAS:

- ➊ **Busiek State Forest and Wildlife Area** Christian County — **18 miles** of hiking trails
- ➋ **Bethany Falls Trail at Burr Oak Woods Nature Center** Jackson County — **1.33 mile** hiking trail
- ➌ **Engelmann Woods Natural Area** Franklin County — **1.5 mile** hiking trail
- ➍ **Millstream Gardens Conservation Area** Madison County — **2 miles** of hiking trails
- ➎ **Peck Ranch Conservation Area** Shannon County — **2.5 mile** section of the Ozark Trail
- ➏ **Runge Conservation Nature Center** Cole County — **2.4 miles** of hiking trails
- ➐ **Big Creek Conservation Area** Adair County — **0.7 mile** hiking trail



FOR MORE INFORMATION, VISIT MDC.MO.GOV

Contents

AUGUST 2018
VOLUME 79, ISSUE 8



FEATURES

10 The Three-Toed Box Turtle

This long-lived reptile needs our help surviving habitat loss and other threats.

by Noppadol Paothong

16 Missouri's Weird Walleye

In Current and Black river country swims a walleye with unique genetics.

by Bill Graham

22 Where Dark Waters Raged in '93

River-edges ravaged by the Great Flood now serve conservation.

by Bill Graham



DEPARTMENTS

- 2 Inbox
- 3 Up Front With Sara Parker Pauley
- 4 Nature Lab
- 5 In Brief
- 28 Get Outside
- 30 Places To Go
- 32 Wild Guide
- 33 Outdoor Calendar



MISSOURI CONSERVATIONIST



ON THE COVER

Des Moines River at Frost Island Conservation Area in northeast Missouri

DAVID STONNER

35mm lens, f/5.6
1/320 sec, ISO 400

GOVERNOR

Michael L. Parson

THE CONSERVATION COMMISSION

CHAIR Don C. Bedell

VICE CHAIR Marilynn J. Bradford

SECRETARY David W. Murphy

MEMBER Nicole E. Wood

DIRECTOR

Sara Parker Pauley

DEPUTY DIRECTORS

Mike Hubbard, Aaron Jeffries,
Jennifer Battson Warren

MAGAZINE STAFF

EDITOR

Angie Daly Morfeld

ASSOCIATE EDITOR

Bonnie Chasteen

STAFF WRITERS

Larry Archer, Heather Feeler,
Kristie Hilgedick, Joe Jerek

CREATIVE DIRECTOR

Stephanie Thurber

ART DIRECTOR

Cliff White

DESIGNERS

Les Fortenberry, Marci Porter

PHOTOGRAPHERS

Noppadol Paothong, David Stonner

CIRCULATION MANAGER

Laura Scheuler

MAGAZINE INTERN

Mikaya Wallis

mdc.mo.gov/conmag



Download this issue to your phone or tablet at mdc.mo.gov/mocon.



Inbox



Letters to the Editor

Submissions reflect readers' opinions and may be edited for length and clarity. Email Magazine@mdc.mo.gov or write to us:

MISSOURI
CONSERVATIONIST
PO BOX 180
JEFFERSON CITY, MO 65102



BUTTERFLIES

Loved the article on monarchs last year [*The Butterfly Effect*, September, Page 10] and now a great one on swallowtails [*Black Swallowtail Butterflies*, June, Page 10].

Carole Hanvey
via email

BLACK SWALLOWTAIL BUTTERFLIES

Just wanted to let you know that the June issue was great. The article on black swallowtail butterflies was very interesting. I liked it a lot. And keep up the good work with turtles [Page 6]. Always point them where they are heading when crossing the road.

Margaret Brill via email



Female
black
swallowtail
butterfly

Fantastic article on black swallowtails. We immediately checked our swamp milkweed and found we had both swallowtail and monarch caterpillars. The picture in the article helped our kids decipher between the two. While looking, we were visited by a zebra swallowtail. Thanks for encouraging us to get outside!

Sonny Catlett Kansas City

PIE AND BUTTERFLIES

I wanted to thank you for the recipe for gooseberry-blueberry crumble in your magazine [June, Page 8]. My 96-year-old mom, who still lives on the farm, made it for a family gathering and it was a hit. You are never too old to try something new.

We also very much appreciated your article on the swallowtail butterflies [Page 10] since we have always (wrongly) thought we had monarch worms on mom's parsley.

Dawn Frierdich St. Louis

ATLATLS

Loved the article about atlatls [*Throwing a Stick with a Stick*, June, Page 22]. It was informative and interesting. I had heard the term before but didn't really know what it was until I read the article. Thanks for explaining it so well. I'm glad something that's been around for centuries is still being recognized and used and that young people are also embracing it.

Diana West via email

CONSERVATION IN MISSOURI

Thanks for the updates you send me via email. I love reading about the record fish caught, the recent archer awards, bears, feral pigs, deer, anything youth-related, etc. I also enjoy the *Conservationist* and my granddaughter enjoys the education publications/programs and *Xplor*. (She has the *Snakes and Toads* and *Frogs* booklets right now.) My kids also did the Conservation Seeds and Charlie the Chipmunk programs when they were young. The past couple years I've also had occasion to work with a couple of conservation agents; great experiences! I don't know much about the conservation agencies in other states, but I think Missouri has great vision and opportunities and really cares about its mission. Good stuff!

Camilla Marble Jackson

Wanted to join with other *Missouri Conservationist* readers to compliment you on your outstanding magazine. The articles are informative and enjoyable, and the breathtaking photography is second to none! Keep up the great work.

Steve Brown Washington

Connect With Us!



/moconservation



@moconservation



@MDC_online
@Nature_Videos

Conservation Headquarters

573-751-4115 | PO Box 180, Jefferson City, MO 65102-0180

Regional Offices

Southeast/Cape Girardeau: 573-290-5730

Central/Columbia: 573-815-7900

Kansas City: 816-622-0900

Northeast/Kirksville: 660-785-2420

Southwest/Springfield: 417-895-6880

Northwest/St. Joseph: 816-271-3100

St. Louis: 636-441-4554

Ozark/West Plains: 417-256-7161

Have a Question for a Commissioner?

Send a note using our online contact form at mdc.mo.gov/commissioners.



Want to see your photos in the Missouri Conservationist?

Share your photos on Flickr at
[flickr.com/groups/mdcreaderphotos-2018/](https://www.flickr.com/groups/mdcreaderphotos-2018/),
email Readerphoto@mdc.mo.gov,
or include the hashtag #mdcdiscovernature
on your Instagram photos.



1

1 | Sumac flea
beetle by **Mark
Beckemeyer**,
via Flickr

2 | Least flycatcher
by **raymonddake
photography**,
via Instagram

3 | Mushroom by
Terri Kraham,
via email



2



3

MISSOURI CONSERVATION COMMISSIONERS



Don
Bedell



Marilynn
Bradford



David
Murphy



Nicole
Wood



Up Front

with Sara Parker Pauley

✕ **Mother Nature is fickle. There's no better example of this** in the Show-Me state than the Missouri River. I wrote this poem, describing the Big Muddy, a few years back in memory of a dear colleague:

*She was a mighty river, like no other in our land
She ran wild like a stallion, with a mane made of sand
Which she pitched and tossed and flung about with a strong,
unbridled will
Then as quickly as you'd turn around, she'd run silently and still*

*Now, men had tried to tame her, tried to rein her powers in
But her torrents, wild torrents, brought defeat time and again
Oh, she'd comply for a while and let man think that he was King
Then she'd silence all his efforts with one mighty surging swing*

When I moved into my home, less than a mile from the Missouri River, I made acquaintance with my lovely new neighbors. When I asked one neighbor if I might walk my dogs along his levee, he heartily agreed, on one condition — if the river levels got high enough to put his farm at risk, I would respond to the call. And early one day in 2011, the call finally came. Although the water lapped to the top of our quickly constructed wall, the sandbags held, and disaster was averted.

Sometimes Mother Nature overrules our best efforts and the Great Flood of '93 was a memorable example of her power (read more on Page 22). The Mighty Missouri provides so much to so many, but she should never be taken for granted. She's proved that time and time again.

Sara Parker Pauley

SARA PARKER PAULEY, DIRECTOR
SARA.PAULEY@MDC.MO.GOV

The *Missouri Conservationist* (ISSN 0026-6515) is the official monthly publication of the Missouri Department of Conservation, 2901 West Truman Boulevard, Jefferson City, MO (Mailing address: PO Box 180, Jefferson City, MO 65102.) **SUBSCRIPTIONS:** Visit mdc.mo.gov/conmag, or call 573-522-4115, ext. 3856 or 3249. Free to adult Missouri residents (one per household); out of state \$7 per year; out of country \$10 per year. Notification of address change must include both old and new address (send mailing label with the subscriber number on it) with 60-day notice. Preferred periodical postage paid at Jefferson City, Missouri, and at additional entry offices. **POSTMASTER:** Send correspondence to Circulation, PO Box 180, Jefferson City, MO 65102-0180. Phone: 573-522-4115, ext. 3856 or 3249. Copyright © 2018 by the Conservation Commission of the State of Missouri.

Equal opportunity to participate in and benefit from programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, religion, national origin, sex, ancestry, age, sexual orientation, veteran status, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to Chief, Public Civil Rights, Office of Civil Rights, U.S. Department of the Interior, 1849 C Street, NW, Washington, D.C. 20240.

Printed with soy ink



Nature LAB

by Bonnie Chasteen

Each month, we highlight research MDC uses to improve fish, forest, and wildlife management.

WILDLIFE RESTORATION

American Burying Beetle Restoration

✳ For millennia, the American burying beetle (ABB) helped decompose dead animals on prairies and other habitats in 35 states. They seek and bury carrion to feed their young. Now the ABB is federally endangered and struggling to survive in less than seven states.

In 2012, MDC entered into a partnership with the St. Louis Zoo, the U.S. Fish and Wildlife Service, and The Nature Conservancy to restore ABB in Missouri, starting at Wah'Kon-Tah Prairie. To track the effort's success, MDC and the St. Louis Zoo started a mark-recapture study in 2016. St. Louis Region Natural History Biologist Andrea Schuhmann heads it up.

"We mark the individuals we capture," she said. "Based on the proportion of new, unmarked beetles to previously captured beetles, we can then develop the population estimate. We want to get a sense of how many wild beetles are being produced out here and are surviving."

As the team starts its third year of population monitoring, it appears ABB numbers are holding



Biologists apply tiny green tags to the wing coverings of captured specimens.

MDC uses mark-recapture methods to track success

steady. "We may have reached a saturation point," Schuhmann said. "Our preliminary analysis shows Wah'Kon-Tah currently has around 80–120 ABBs, and we suspect this may be the maximum number it can support in a given year."

Schuhmann said this year her team will expand their work to other MDC properties. Last year they documented ABBs dispersing to Monegaw Prairie Conservation Area, which is about 2 miles south of Wah'Kon-Tah. "This was great news, especially since we found both males and females. It could mean they are reproducing outside of the study area."

ABB Restoration at a Glance

Wah'Kon-Tah Prairie



Trapping and marking:

Biologists set baited buckets covered with wire into the ground. ABB crawl in but they can't get out. Biologists tag captured ABB.

Monitoring:

Throughout the summer, biologists spend several consecutive nights trapping ABB, comparing each night's marked versus unmarked beetles.



Trend:

Encouraging! Numbers appear to be holding steady (2–4 beetles per area square kilometer). There's also evidence of reproduction outside the study area, and many large, ABB-friendly public prairies lie within ABB's carrion-smelling range.



Orange organs allow ABB to smell carrion from 2 miles away.

1,000

ABB is Missouri's target population

MAIN: JEANETTE BAILEY; MONITORING INSET AND ABB: NOPADOL PAOTHONG

In Brief

News and updates from MDC

Get hunting details
by species at
huntfish.mdc.mo.gov



MIGRATORY BIRD AND WATERFOWL HUNTING START NEXT MONTH

GET INFO,
BUY PERMITS,
AND APPLY FOR
RESERVATIONS

➔ September marks Missouri's migratory bird hunting seasons, with doves, snipes, and rails beginning Sept. 1. Waterfowl season kicks off with opening day for teal Sept. 8.

Get detailed information on related migratory bird and waterfowl seasons, species, regulations, permits, limits, and more from our *Migratory Bird and Waterfowl Hunting Digest 2018-2019*, available where hunting permits are sold and online at short.mdc.mo.gov/Zc3.

Buy hunting permits from numerous vendors around the state, online at mdc.mo.gov/buypermits, or through our free MO Hunting mobile app, available for download through Google Play for Android devices or the App Store for Apple devices.

WATERFOWL RESERVATIONS OPEN SEPT. 1

Waterfowl hunters have from Sept. 1-18 to apply online to hunt on 12 wetland areas intensively managed for waterfowl. For more information and to apply starting Sept. 1, visit short.mdc.mo.gov/Z4W.

The reservation system allocates half of the available hunting opportunities on these areas for Missouri residents chosen through a random drawing. The other half are for walk-in hunters who draw on-site each morning for the remaining spots.



DISCOVER NATURE AT THE MISSOURI STATE FAIR

Visit the Conservation Building at the Missouri State Fair from 9 a.m. to 7 p.m. Aug. 9–18 and 9 a.m. to 6 p.m. Aug. 19 to see live fish and other native animals such as snakes, turtles, and amphibians. See displays of native plants that help butterflies and other important pollinators. Talk to staff, get educational materials, and have fun.

Don't miss our air-conditioned Conservation Kids Discovery Room between 10 a.m. and 6 p.m. for hands-on fun discovering nature through crafts and other activities.

Enjoy these free conservation-related programs at our outdoor pavilion:

- **Raptors of Missouri**
See a live eagle and other birds of prey up close Aug. 9 and 18 at 11 a.m., 1:30 p.m., and 4 p.m.
- **Fish Cooking and Cleaning Demonstrations**
Learn to prepare your fresh catch Aug. 10 and 11 at 11 a.m. and 1:30 p.m.
- **Mushroom ID**
Learn about Missouri mushrooms Aug. 16 at 11 a.m. and 1:30 p.m.
- **Forest Products**
The Circular Sawmill: See a working model sawmill Aug. 17 at 11 a.m. and 1:30 p.m.
- **Dutch Oven Demo**
Watch a live demonstration on Aug. 19 at 11 a.m. and 1:30 p.m.

Don't miss the special program on invasive plants and animals from 10 a.m. to 2 p.m. Aug. 10 at the Missouri Department of Transportation Highway Gardens, located next door to our outdoor pavilion. It will include displays and activities on how invasives harm native species, habitats, crops, roadsides, and backyards. Help stop the invasion by joining the fight and learning what you can do to help eliminate these unwanted invaders.

Learn more about our programs, events, and other offerings at mdc.mo.gov.

MDC LAUNCHES RESEARCH WEBSITE

Want more information on the science behind Missouri's world-class fish, forest, and wildlife management? MDC recently launched a new website dedicated to the extensive scientific research staff conduct on these and other topics.

Black bears in Missouri is a popular topic, and staff have been conducting research since 2010. One new and exciting feature of the website is the Missouri Black Bear Project Story Map at mdc.mo.gov/BlackBearProjectStoryMap. You can explore maps, photos, and videos of Missouri black bears and the research we are conducting.

For more information, visit research.mdc.mo.gov.

Ask MDC

Got a Question for Ask MDC?

Send it to AskMDC@mdc.mo.gov
or call 573-522-4115, ext. 3848.

Q: What bird is this?

➔ This is a juvenile black-crowned night-heron.

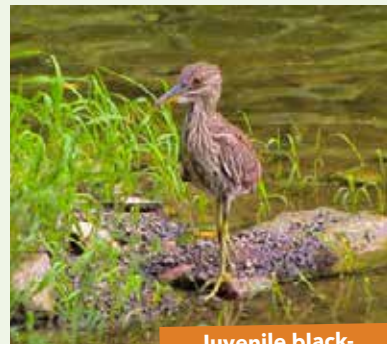
Sometimes confused with juvenile yellow-crowned night-herons, black-crowned herons have black-and-yellow bills and more pronounced white spots on their wings than the yellow-crowned herons.

These birds breed in colonies near Missouri's swamps, marshes, ponds, rivers, and lakes. Males choose the nesting sites and often select places over water on an island or in a swamp — safe from predators.

Studies of their stomach contents show these opportunistic foragers eat a wide variety of foods, including fish, insects, worms, amphibians, leeches, crayfish, mussels, reptiles, other birds, eggs, carrion, and plant materials.

Q: Recently I watched two eastern cottontail rabbits engage in what appeared to be a choreographed tumbling or dance routine. They somersaulted over each other for a few minutes before they took off. Is this behavior common?

➔ You witnessed ritualized courtship behavior, better known to humans as flirting. When this occurs, the male



Juvenile black-crowned night-heron

approaches the female from the rear, and she quickly turns to face him. He then rushes at her, and she jumps over him. They may continue this pattern, or they may reverse roles.

Cottontail breeding season begins in mid-February and continues through September. Multiple litters can occur in a single season, and nests tend to have four to six young per litter. At birth, cottontail rabbits are about 4 to 5 inches long, mostly naked, with eyes and ears closed. After a week, they have their complete fur coat and their eyes and ears are open. They leave the nest 13–16 days after birth.

Q: What would cause these toadstools to grow in a circle like this?

➔ Commonly called a "fairy ring," these naturally occurring mushroom circles grow in grassy areas, lawns, and meadows.



Fairy ring

To understand how a fairy ring is created, it helps to understand how mushrooms grow. Like peaches on a tree, mushrooms are the fruiting body of a fungus. They typically appear above ground and contain the organism's reproductive units or spores. The vegetative portion of the fungus — the mycelium — is typically below ground and consists of a mass of branching, threadlike strands that push through the soil, feeding on nutrients.

When the surrounding soil is

evenly composed, and the food supply is uninterrupted — which is common in carefully tended lawns — the mycelium continually spreads outward looking for nourishment. So, when the mushrooms surface, they can appear in an arc or complete circle that gradually expands over time.

Many different terrestrial mushroom species can pop up in fairy rings. With or without the mushrooms, these circles are sometimes visible because the grass often grows darker in places where the mycelium is active.

AGENT ADVICE

from

Chris Decoske

RANDOLPH COUNTY
CONSERVATION AGENT

In August, conservation areas are busy with visitors trying to enjoy the remaining days of summer. Lots of people can mean lots of litter — cans, bottles, fishing line, empty bait containers, and more. This trash is not only unsightly, it's dangerous. I recently received a call about a goose with its leg trapped in discarded fishing line. If not caught, that goose will suffer as the fishing line continues to tighten, leading to infection, amputation, or eventual death. Littering is also costly. It can result in a fine, and cost conservation employees and partner agencies valuable time cleaning up rather than doing important work conserving our precious resources. Let's leave nature better than we found it. **Don't litter, and**

dispose of trash you find, especially on conservation areas.



What IS it?

Can you guess this month's natural wonder?

The answer is on
Page 9.





WALLEYE TIDBITS

When it comes to eating fish, you can't beat walleye. It has a light, delicate flavor that can be served in many ways. This recipe can be used as an appetizer or an entrée. These tidbits are hearty enough for a meal, but they fry up like chips, so they may not make it to the supper table!

INGREDIENTS:

Walleye filets
Cornmeal
Salt
Pepper
Peanut oil*

CLEAN and wash walleye filets. Use a very sharp knife and cut across the width of each filet, making extremely thin slices.

COMBINE cornmeal, salt, and pepper in a plastic bag. Add tidbits and shake until coated. Continue this process until all pieces are breaded. Fry the tidbits in the hot peanut oil until crisp and golden brown. Drain on paper towel. Salt to taste. Serve.

**For easier browning, use pre-seasoned oil or oil that has been used to fry something else*



Watch a video
for this recipe at
short.mdc.mo.gov/ZcZ



NOMINATE CITIZEN CONSERVATIONISTS FOR AWARDS

The Missouri Conservation Commission recognizes citizens who make outstanding contributions to conservation. It is seeking nominations for its Master Conservationist Award and the Missouri Conservation Hall of Fame.

The Master Conservationist Award honors living or deceased citizens. The Missouri Conservation Hall of Fame recognizes deceased individuals.

Those who can be considered for either honor must be:

- A citizen who performed an outstanding act or developed an innovative idea or technique that contributed to major progress in conservation in Missouri.
- An employee of the Department of Conservation, other conservation-related government agencies, universities, or organizations who performed an outstanding act or developed an innovative idea or technique that contributed to major progress in conservation in Missouri.

Learn more about the Master Conservationist Award and get the nomination form at mdc.mo.gov/about-us/awards-and-honors/master-conservationist.

Learn more about the Missouri Conservation Hall of Fame and get the nomination form at mdc.mo.gov/about-us/awards-and-honors/hall-fame.

Anyone can submit nominations, including a statement describing the nominee's accomplishments and a brief biography. A screening committee meets annually to consider nominees with the Conservation Commission conveying final approval.

Submit nominations by Sept. 1 to: Denise Bateman, Missouri Department of Conservation, PO Box 180, Jefferson City, MO 65102-0180, or email Denise.Bateman@mdc.mo.gov.



GET FEDERAL DUCK STAMPS ONLINE

MDC no longer sells physical Federal Duck Stamps through our offices, but hunters can still buy electronic duck stamps through our online permits website at mdc.mo.gov/buypermits or through our free mobile app, MO Hunting.

Electronic Federal Duck Stamps purchased through our permits website or the MO Hunting app will appear on the app. Learn more about MO Hunting at bit.ly/2LsOCJg.

Out of the 33,300 duck stamps sold through MDC last year, only around 500, or 1.5 percent, were physical stamps. The rest were electronic duck stamps purchased online.

For more information on the Federal Duck Stamp program, go online to fws.gov/birds/get-involved/duck-stamp.php.

WHAT IS IT?

TIGER MOTH (*APANTESIS*)

Missouri is home to many species of tiger moths, including three that can be difficult to distinguish. The banded, nais, and harnessed tiger moths all share similar colors and wing patterns. You may have seen one of these common moths on your back porch after leaving the light on all night. Tiger moth caterpillars feed on low-growing plants like dandelions, violets, plantain, and clover. These caterpillars are often covered in hairs and sometimes referred to as "woolly bears."



the THREE-TOED



Box TURTLE

THIS LONG-LIVED REPTILE NEEDS
OUR HELP SURVIVING HABITAT LOSS
AND OTHER THREATS

by Noppadol Paothong



The three-toed box turtle is the official Missouri state reptile. Box turtles are admired for their longevity, sturdiness, and resilience.

Driving through the countryside one cool spring morning, I couldn't help but notice several slow-moving box turtles crossing the road, on the hunt for food, mates, and warm spots to bask in the sun.

Sadly, many box turtles never make it across the road, which they likely see as just another open, sunny area in their habitat. Road-building and other forms of habitat loss have contributed to the box turtle's overall decline throughout its North American range. Getting to know the box turtle's life cycle and habitat needs can help us do a better job of conserving it.

An Emblem of Longevity

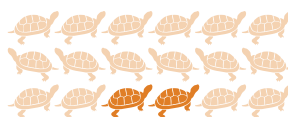
Although box turtles face many dangers during the first few years of their lives, they actually live an average of 40 to 50 years. In a 25-year study of approximately 1,700 three-toed box turtles conducted by Charles and Libby Schwartz, the oldest specimen was 65. While most Missouri turtles live 15 to 30 years, box turtles can live 50 to 80 years, and occasionally more than 100 years. Due to their long life span, slow movement, sturdiness, and wrinkled appearance, turtles in general are an emblem of longevity and stability in many cultures around the world.

Missouri is home to 18 species of turtles, including two species of land-dwelling turtles, the three-toed box turtle (*Terrapene carolina triunguis*), Missouri's official state reptile, and the ornate box turtle (*Terrapene ornata ornata*). They are found throughout most of Missouri (see map at right). The three-toed box turtle prefers a forested landscape with numerous open grassy areas while the ornate box turtle is found primarily in the prairie regions of Missouri.

The name "box turtle" refers to the ability of this reptile to tightly close its shell when frightened or startled. A hinged lower shell allows these reptiles to completely encase their head and legs, providing protection. The name "three-toed" refers to the three toes (and claws) on the hind legs of most specimens.



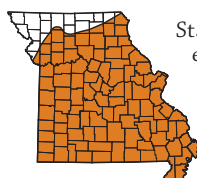
MISSOURI BOX TURTLES 2 species



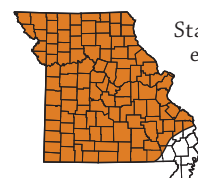
THREE-TOED BOX TURTLE
Terrapene carolina triunguis



ORNATE BOX TURTLE
Terrapene ornata ornata



Statewide distribution
except for extreme
northern and
northwestern parts
of the state



Statewide distribution,
except for the southeastern
corner of the state, and
is more common in the
western and northern
parts of Missouri

BOX TURTLE LIFE SPAN 50–80 years



**HOME
RANGE**
2–5 acres



EYE COLORS



Males are red
to reddish-brown



Females are brown
to yellow-brown

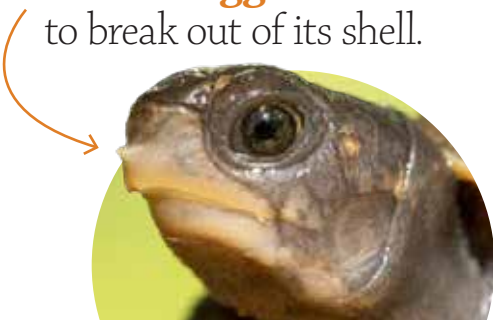




Hatchlings can take two or even three days to fully emerge from their shell. This process can be critical for a young turtle because it still has a considerable amount of nutrients to absorb from its yolk sac before venturing out into a new world.



A turtle's **egg tooth** is used to break out of its shell.



A newly hatched turtle is just **1 inch** long.



The three-toed box turtle can be colorful or drab, depending on its age. Younger turtles normally have an olive-brown shell with faint yellow or orange lines radiating from the center of each scale. They also have a few dark-brown markings along the top of the upper shell. Skin on the head, neck, and front legs of three-toes can be quite colorful, with patches of orange, yellow, white, tan, dark brown, and black. This is especially true of adult males. Males also have red to reddish-brown eyes, while females' eyes are typically brown to yellow-brown. They typically range in upper shell length from 4 to 5 inches.

Box turtles are omnivores, but their diets vary by season and the availability of food sources. They are known to eat earthworms, insects, snails, slugs,

mulberries, strawberries, mushrooms, and green-leafed vegetation. Adults usually have a home range of 2–5 acres.

Differences between males and females can be hard to detect to the untrained eye. The lower shell of an adult male box turtle (all species) has a dent or concave area that allows it to breed with a female. In contrast, the lower shells of females are flat with no indentation.

Box turtles become active in April. Courtship and mating last from late April to July or later. The male three-toed box turtle courts by pulsating his orange throat. Most egg-laying occurs from May to early July. At dusk, the female selects an elevated, open patch of soil or sand and digs a hole with her hind legs. A clutch is usually three to eight eggs, which hatch in about three

Both three-toed and ornate box turtles are fond of eating soft-bodied insects and earthworms. In the wild, they are known to eat strawberries, mulberries, black raspberries, and blackberries. Mushrooms, tender shoots, and flowers are also favorites.

months. There are one to two clutches per season. Unlike adult turtles that are protected by their shells, hatchlings are only about 1 inch long and are especially vulnerable to predators. Box turtles dig into leaf litter and soil and go dormant to survive cold winter months.

Because they are naturally docile, box turtles are a great way to help children learn to appreciate native reptiles and their conservation needs. These



Turtles are an emblem of **longevity and stability** in many cultures around the world.



Because box turtles are docile, they can help children learn to appreciate nature. However, box turtles do not do well in captivity, so it is best to release them back to where they were found.

slow-moving, harmless reptiles are easy to observe and handle. While you may be tempted to keep one as a pet, box turtles, in particular, do poorly in captivity and have requirements that can be difficult to meet. It is best to leave them in the wild.

To help turtles thrive in Missouri, keep your eyes open for turtles in your path, especially in spring and summer when they are mating and nesting. These box turtles need all the help they can get to ensure their survival in this fast-changing world. ▲

Noppadol Paothong has served the Missouri Department of Conservation for the past 12 years. He strives to help people connect with conservation issues that he cares deeply about.

UPPER SHELL LENGTH
4–5 inches



actual size





MISSOURI'S Weird Walleye



IN CURRENT AND BLACK RIVER COUNTRY
SWIMS A WALLEYE WITH UNIQUE GENETICS

by Bill Graham | photographs by Noppadol Paothong

Glaciers and biological chance

set apart the walleye that angler Cecil Murray seeks in the lower Current River's deep pools. A particular strain of this toothy fish swims only in four southeast Missouri Ozark rivers. Its closest genetic relatives live far away in a few streams in western Appalachia. It has typical walleye golden-green colors and eyes that appear glassy when held at certain angles. But MDC geneticists, fish hatchery managers, and fisheries biologists know from lab tests and field experience that this fish is different from most other walleye strains in North America.

For a quarter century, MDC staff has worked to save distinct genetic traits the Black River-strain walleye carry in the Current, Black, Eleven Point, and St. Francis rivers. Genetic diversity in nature provides strength and beauty. Anglers benefit from the genetics in this fish because the Black River-strain grows larger than walleye strains native to northern states, and they're catchable from the ever-flowing beauty of a river.

"Walleye down here are considered the best eating fish in the river," said Murray, 78, of Doniphan. "They're a lot of fun to catch on top of that."

Whether from wooden johnboats or modern jet boats, Murray has fished for walleye in the Current River all his life. He's guided anglers on the river since he was 18. Walleye start biting his trolled crankbaits in late August, and he catches them through winter and the early spring spawning run.

"The biggest walleye I ever saw was a 17-pounder." Murray said it was a fish caught by another angler.

But the river's fishery got even better for anglers two decades ago when MDC began stocking Black River-strain fingerlings raised in a hatchery.

"We didn't use to catch as many walleye as we do now," Murray said. "I'd have to say for sure it helps."

Cecil Murray
trolls the lower
Current River
for walleye.

JOSEPH TOWELLER ILLUSTRATION

A Fishy Genetic Surprise

Anglers historically caught walleye from rivers throughout the state, but rarely in large numbers. Missouri is on the southern edge of the species' native range. When some rivers were dammed to create lakes, new walleye habitat was created, and MDC raised walleye in hatcheries to supplement their numbers. That approach has supported a popular and productive walleye fishery in lakes.

Early in stocking programs, brood fish often came from the Great Lakes region. Managers stocked Northern fingerlings and fry under the assumption that a walleye is a walleye, no matter its origin.

But fisheries biologists also wondered about the surprisingly large walleye caught from lower reaches of rivers like the Current and the Black. A 20-pound, 8-ounce walleye caught from the St. Francis river in 1961 held the state record until 1988. Although river walleye populations weren't large, anglers often caught big ones, especially during spawning runs in late winter or early spring. Large fish and river settings make them special, said David Knuth, MDC fisheries management biologist. Anglers have a chance to catch a 14- or 15-pound walleye, or bigger.

"For anglers, where else can you go fish in a clear-water river for a walleye that's a wall-hanger?" Knuth said.

MDC biologists in the 1960s wondered if more wall-worthy walleye could be provided in those rivers by stocking hatchery-reared fish. A study of river walleye was followed by an experimental stocking in 1969 of Great Lakes-strain hatchery fry in the Current River. The fry didn't survive well enough to increase the population. That was a clue river walleye are different from lake-origin walleye.

In the 1990s, genetic science revealed just how different they are. MDC and fisheries biologists around the nation began to recognize the importance of genetic diversity in all fish species strains, and new lab technologies enabled them to track genetics. MDC embraced new scientific discoveries and implemented a fisheries policy to preserve local genetic stock whenever possible.

In the late 1990s, MDC prepared to restore walleye to the upper St. Francis River with brood fish from the Black River, an adjacent basin. Jeff Koppleman, a former MDC fisheries researcher, tested the DNA of walleye from around Missouri. He discovered that walleye from the Black and Current rivers had genetics distinct from those where lakes had been stocked with hatchery fish with origins in the Great Lakes region.

"Jeff caught a glimpse of something special, and it's resulted in something even more special," said Leah Berkman, MDC biometrician and geneticist.

Ancient Origins

In 2017, Berkman used DNA sequences from Koppleman's research and the same genetic data from studies in

Black River-strain walleye can grow quite large. MDC staff caught and released this lunker during fish population sampling on the Current River.





Chelsea Titus, wildlife biologist, checks DNA at MDC's Conservation Genetics Lab in Columbia to make sure only Black River-strain walleye are spawned for the hatchery program preserving that strain.

other states to connect the Missouri fish with unique but similar walleye strains in a few western Appalachian streams in West Virginia, Kentucky, and Ohio. That revealed the relationships between the southeast Missouri walleye with what fisheries biologists nationally call the Eastern Highlands walleye strains, distinct from walleye labeled as Great Lakes strains.

"It's just a really clear, obvious thing from a genetic standpoint," Berkman said. "Some things are not as nice and clear as this."

Biologists looked to ancient North American glaciers for answers why. A leading theory is that a great, preglacial river called the Teays once flowed northwest from the Appalachian Mountains and then west to join an ancient Mississippi River course, waters mingling within fish-swimming distance of where Ozark rivers met the Mississippi. But advancing and retreating glaciers during the Pleistocene geologic epoch altered the rivers' courses, buried valleys, created new rivers, and cut off walleye populations in Teays River courses from similar walleye in the Ozarks. Walleye where the Black River-strains are found today were also cut off from walleye in other Missouri streams.

"They've got a great back story from the glaciers," said Berkman, who is a fan of the fishes' uniqueness. "And I don't fish," she said. "I'm a data nerd."

Help From Hatcheries

In 1998, MDC implemented a statewide walleye management plan that included stocking only the Black River-strain in the Current, Black, Eleven Point, and St. Francis rivers to keep those fisheries healthy. But raising the Black River-strain in a hatchery has proved to be more difficult than raising Great Lakes strains. Genetics are not the only difference between river and lake walleye.

The adults look identical, but the river-strain eggs are up to 25 percent larger. Fry, once hatched, need to be moved more quickly to rearing ponds to feed. Plus, nature and the weather don't always match up well with hatchery schedules.

This year, heavy rains in February brought high water and flooding just when MDC fisheries biologists were attempting to collect brood stock from the Black and Current rivers. They use nets and electroshocking to collect females and males preparing to spawn in February and early March. Often, they work at night when walleye are active and moving upstream, dealing in some places with swift river currents and rocky shoals.

The Black River walleye "are the earliest in the state for spawning," Knuth said. Females are often done by the last week of February.

On March 4 of this spring, biologists collected the last group of brood stock fish needed for 2018's hatchery spawning, four females and 20 males from the lower Current River. The biologists attached a slender plastic ID tag on each fish, so they can be tracked through the hatchery process. Andy Cornforth, manager of MDC's Chesapeake Fish Hatchery near Mount Vernon, drove over that night to pick them up. The hatchery staff began preparing the fish for spawning the next day. Each walleye was weighed, measured, and given hormone shots to enhance the spawning process before it was placed in holding tanks.

Egg samples were pulled to examine how close the females were to spawning. Most females weighed 4 to 6 pounds, but they can be bigger.

"The biggest females we've had in here have weighed 16 to 18 pounds," Cornforth said.

Samples from fins were also clipped and shipped to MDC's Conservation genetics lab in Columbia. Berkman and staff do DNA analysis for each fish before it is spawned at the hatchery to ensure it is a Black River-strain walleye.

When the females are ready to lay eggs, hatchery staff strips the eggs and fertilizes them with milt extracted from the males.



Staff then place the eggs in jars with water flowing through them until the fry hatch. When the fry are three days old, staff move them to outdoor rearing ponds that have been fertilized to encourage phytoplankton and zooplankton growth.

"They have to get on food pretty quickly," said Brad Russell, assistant hatchery manager. "They start eating the zooplankton out in the pond."

In the river, the walleye females will lay eggs when they are ready, males will fertilize the eggs with milt, and then the eggs and fry must survive predators and the stream's variable currents. Each adult fish is a miracle, considering all they must survive.

Chesapeake Fish Hatchery staff carefully handle Black River-strain walleye ready for spawning. They give each brood fish an ID tag, test its eggs, and then give it hormone shots to stimulate spawning. After they collect fertilized eggs and put them in hatching jars, they release the fish back into the wild.



"My dad and his dad, and local people, they all fished this river," Murray said of the lower Current. "But I guarantee you that we catch more walleye now than we used to."



Conditions at the Chesapeake Hatchery are more controlled but not foolproof. The fry do best when water temperatures in the rearing ponds are above 50 degrees, but that's spring-weather dependent. In 2017, an extreme temperature drop chilled the water in rearing ponds and wiped out the year's hatch of walleye fry.

Hatchery staff this year ended up with 370,105 Black River-strain fry out of more than 1.2 million eggs fertilized, Cornforth said. They then stocked 151,000 fry in three rearing ponds. The remaining fry were shared with Arkansas, which is cooperating with MDC on management of the strain in shared waters. Over the last 20 years, the hatchery has averaged an 11-percent return of Black River-strain fry reaching the fingerling stage for stocking, Cornforth said. The Great Lakes strains average 50 to 55 percent return in a hatchery.

Black River-strain propagation owes much of its success to the hatchery staff working through unusual challenges. This year's cold spring took a toll on fingerling numbers.

"It's a very finicky fish, even though it looks like any other walleye," said John Ackerson, MDC fisheries management biologist.

Next Generations

In May, MDC biologists stocked 20,000 Black River-strain fingerlings an inch or more long into the lower Eleven Point River. The fingerlings were offspring of 10 females and 27 males handled by the hatchery this spring. Carefully, the fingerlings are moved from trucks to the river via boat, into deep pools where the current and predators are minimal.

"There's a lot of time and effort that goes into raising these guys, so we want to give them the best chance for survival," said Blake Stephens, an MDC fisheries management biologist supervising the stocking.

MDC includes 148 miles of the four Ozark rivers within the Black River-strain management program. Each river is stocked once every four years in a rotation. The approach helps preserve the Black River-strain's unique genetics and serves anglers.

"We're increasing the year-class strength for anglers," said Paul Cieslewicz, an MDC fisheries management biologist who has worked on the river walleye program since its inception. "In three years after stocking, we'll have a big year-class of 16-inch fish."

Data and observations about fingerling stockings and fish movement suggest the Black River-strain possesses adaptations that enhance their survival.

"My feeling is these fish are suited for the river system," Cieslewicz said. "They have some kind of advantage, though I can't tell you what it is."

Berkman will continue to do DNA analysis on walleye from various streams and lakes in Missouri and Arkansas, looking for more fish with surviving native genetic traits. She admires the MDC fisheries biologists who decades ago chose a policy that preserved the Black River-strain's uniqueness.

"They were thinking about this early and choosing not to take the easy route," she said.

Their dedication to science has also helped anglers like Murray.

"My dad and his dad, and local people, they all fished this river," Murray said of the lower Current. "But I guarantee you that we catch more walleye now than we used to." ▲

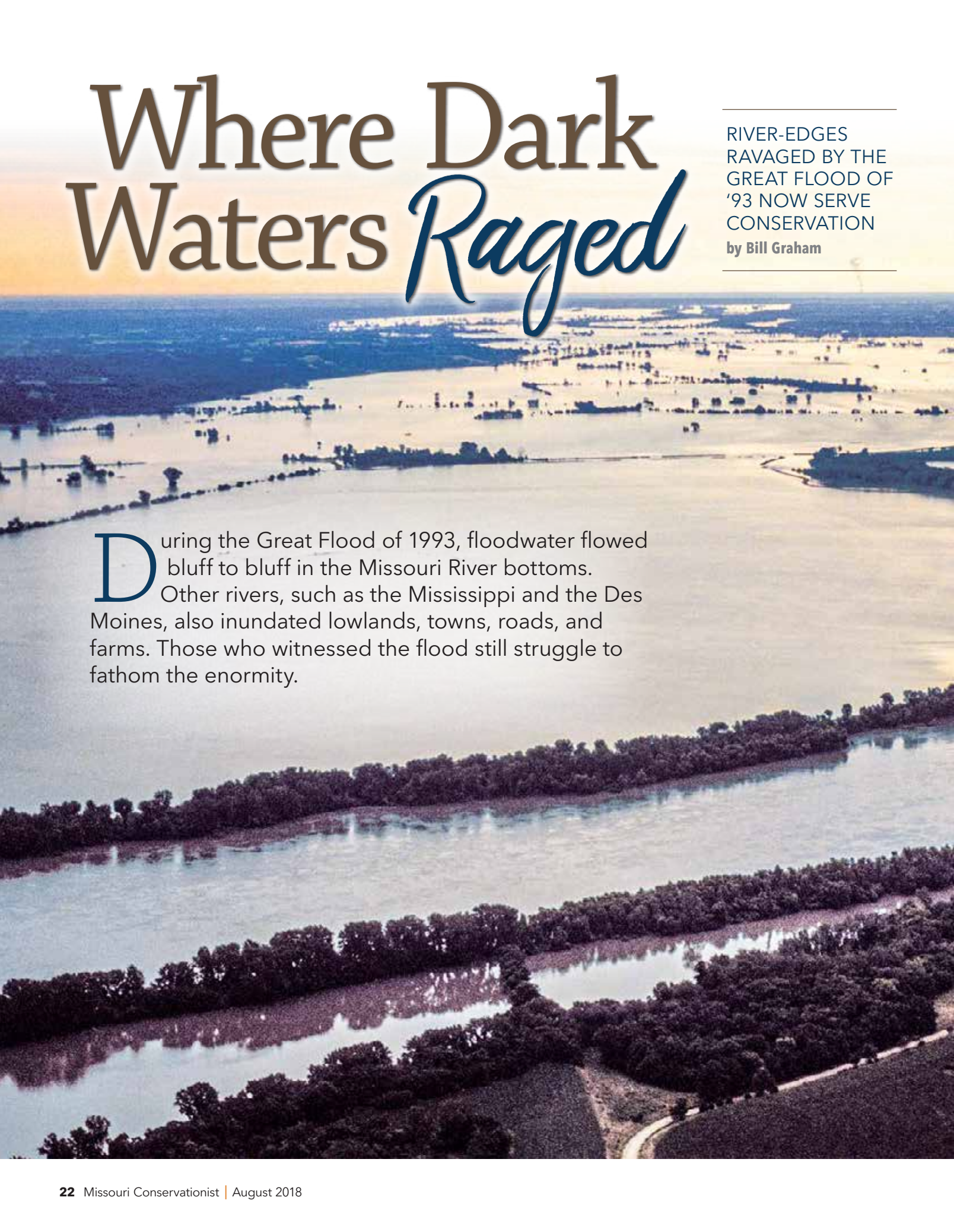
Bill Graham is MDC's Kansas City Region media specialist. He's a lifelong hunter, angler, and camper who also greatly enjoys hiking and photography in Missouri's best wild places.



Where Dark Waters *Raged*

RIVER-EDGES
RAVAGED BY THE
GREAT FLOOD OF
'93 NOW SERVE
CONSERVATION

by Bill Graham



During the Great Flood of 1993, floodwater flowed bluff to bluff in the Missouri River bottoms. Other rivers, such as the Mississippi and the Des Moines, also inundated lowlands, towns, roads, and farms. Those who witnessed the flood still struggle to fathom the enormity.



Missouri River flood
in Howard County

PHOTOGRAPH BY
JIM RATHERT

"It was historic, I've never seen anything like it," said Craig Gemming, an MDC fisheries regional supervisor based in Columbia.

Gemming was among the many MDC employees responding to emergencies as the floodwaters raged. "The flood overtopped all the levees up and down the Missouri River, and the whole flood plain was covered. When you think about how much water was up and down the river, it's staggering."

The U.S. Geological Survey considers the '93 flood among the costliest and most devastating in modern U.S. history. Floodwater surged across nine Midwestern states causing 47 deaths, displacing more than 50,000 people, inundating 20 million acres, and leaving \$20 billion in damages. In Missouri, flooding severely damaged cities and farms near many rivers. But the devastation was especially acute in the Missouri River valley. Roiling water punctured levees, gouged holes in crop fields, and deposited sand dunes. People and fields needed healing when the water receded.

Today, the great flood's legacy connects MDC conservation areas along the Missouri River. They range from Derooin Bend in the state's northwest corner to Columbia Bottom where the Missouri and Mississippi rivers meet at St. Louis. Rivers still flood. Farmers still raise crops on most of the river bottom's fertile acres. But along big-river edges, some lands scarred by the 1993 flood now serve conservation.

Conservation's Helping Hand

Missourians in flood-ravaged communities looked for help when the water receded. MDC assisted the Governor's Task Force on Flood Plain Management. The multiagency task force was asked to provide relief for owners of flood-damaged land and find ways to reduce future flood damage. In response, the Missouri Conservation Commission



Deroin Bend Conservation Area

authorized the purchase of flood-damaged land along the Missouri River from willing sellers to be used for fish and wildlife habitat and outdoor recreation.

At the same time, the U.S. Army Corps of Engineers (the Corps) purchased land for a river habitat mitigation program, and the U.S. Fish and Wildlife Service created the Big Muddy National Wildlife Refuge with a chain of river bottom lands in central Missouri. A federal emergency wetland reserve program paid some landowners for wetland easements and provided funds for public land purchases.

By 2007, MDC had acquired almost 14,000 acres in the flood mitigation effort. MDC also assumed management under lease agreements of 9,000 acres bordering the river owned by the Corps.



Nurturing River Species

After the 1993 flood, and as subsequent floods came and went, researchers from MDC, the University of Missouri, and other institutions studied how connectivity to the flood plain affects fish populations. Those studies showed that shallow or quiet-water places are important for the growth of young sport fish like blue and flathead catfish and the small forage fish they feed on.

The flood created new fish-spawning and nursery habitat in chutes and wetlands. That complemented changes such as wing dikes the Corps notched to diversify aquatic habitat.

“Combined with the Corps’ projects, it’s gone a long way to improving the fishery out in the river,” Gemming said.

One example is a restored 4-mile river chute through the 1,164-acre Deroin Bend Conservation Area in Atchison and Holt counties. MDC purchased the flood-prone river bend after the

’93 flood. The Corps later reopened the chute to mimic the river’s original braided channel before changes for navigation and flood control.

Anglers, turkey hunters, birders, and morel mushroom seekers find access via three MDC parking lots, including one where water flows into the chute.



The regrowth of bottomland forest enables good wild turkey hunting at Marion Bottoms Conservation Area.

CONSERVATION AREAS: DAVID STONNER; CATFISH: JIM RATHERT

Providing Big-River Recreation

Conservation areas owned by MDC before the flood suffered heavy damage during 1993. For example, a gravel road inside a levee but near the river was heavily damaged at the Bob Brown Conservation Area north of St. Joseph. MDC considered abandoning the roadway, said Craig Crisler, MDC wildlife management biologist. But the road offers anglers a direct route to fishing accesses along the Missouri River. So MDC committed to keeping the road open for anglers, waterfowl hunters, and birders. The fishing accesses are marked with signs and have gravel pull-offs for parking.

"It's the only place in the state where you can park at 10 different places and walk right over the levee to the river," Crisler said.

Some areas MDC purchased or enlarged after the flood are small in acreage, but they connect people with nature's wide-ranging moods on the Missouri River. The French Bottom Access, Jentell Brees Access, and Arthur DuPree Memorial Conservation Area have boat ramps serving the St. Joseph area.

MDC owned the Cooley Lake Conservation Area near Kansas City before 1993. The area had an oxbow lake but was distant from the river. After the flood, MDC purchased a separate tract with river frontage. The Cooley Lake Access has a boat ramp and a place to fish from shore.

Downstream of Kansas City, the Hardin Conservation Area in Ray County offers walk-in fishing from shore on the Crooked River near its Missouri River confluence. Plus, the area has a deep scour hole with fish and bottomland forest for wildlife habitat. In Chariton County, anglers and hunters can use the Dalton Bottoms Access with its parking lot, privy, and boat ramp on the Missouri River's north shore. The 54-acre access is on land purchased after the flood.



Bob Brown Conservation Area



Cooley Lake Conservation Area

"It gets used pretty heavily all year," said Chris Freeman, MDC wildlife management biologist. "People come to fish. But it also gets used by waterfowl hunters to get on the river."

River Bottom Forest Reborn

Swollen tributaries pushed the Missouri River to record heights as the 1993 floodwaters flowed past river cities such as Boonville, Jefferson City, and Hermann. In the years after, historic names were affixed to conservation areas salvaged from places where the flood scarred land. In the heart of the state, MDC added conservation areas, such as Diana Bend in Howard County

and Plowboy Bend in Moniteau County. The Osage River flows into the Missouri at the Smoky Waters Conservation Area in Cole and Osage counties.

During dry times these areas serve conservation and recreation. But during floods, they give the river extra room to overflow, taking some pressure off levees and protecting farms and towns.

Nature provides post-flood healing for conservation areas. In the years



Marion Bottoms Conservation Area

Missouri's Other River Border

Another major Midwestern waterway, the Des Moines River, nips Missouri from Iowa in the state's northeast corner near St. Francisville. The Des Moines also flowed far from its banks during 1993. MDC purchased the 1,232-acre Frost Island Conservation Area with uplands, an oxbow lake, and seasonal wetlands as part of the state's flood recovery effort. The area is upstream of the Des Moines River's confluence with the Mississippi, east of Kahoka in Clark County.

"The special thing is it has a sand prairie, one of the few and the only one in north Missouri," said Darlene Bryant, area manager. "Since it borders the Des Moines River, there are also fishing opportunities."

St. Louis Connections

Both big cities and rural areas were deeply affected by floodwaters in '93. After the flood, MDC purchased 42 sand-covered acres from St. Louis County for the Pelican Island Access. Boaters can launch on the Missouri River north of Florissant and downstream from Pelican Island Natural Area. Anglers can fish from the river bank and in a slough.

In the flood's wake, MDC added 1,000 acres bordering the river to the Weldon Spring Conservation Area in St. Charles County. Visitors to the area's Darst Bottom Tract will find wetlands and restored native grasslands. Cottonwoods and willows dominate a developing bottomland forest. MDC offers special managed hunts for deer and turkey, said John Vogel, MDC regional wildlife supervisor.

"It's a highly popular morel mushroom hunting place because it's in the river bottom," Vogel said.

Where the Great Rivers Meet

Mighty rivers meet at MDC's Columbia Bottom Conservation Area in north St. Louis County. A scenic observation platform lets visitors watch the Missouri and Mississippi rivers mingle more peacefully than they did in '93. Visitors can hike on trails meandering among a 4,318-acre mosaic of wetlands,

since '93, forests reclaimed some bottom ground. Native aquatic plants populated flood-carved wetlands. Waterfowl and fish began using scour holes.



MDC enhanced habitat and provided access for wildlife watchers, hikers, anglers, and hunters.

Tall and stately cottonwoods are a reborn bottomland forest at the 2,997-acre Marion Bottoms Conservation Area in Cole County. Willow thickets cover wet areas. Bright blue indigo buntings flit about along an access road through the bottoms that is open to the public during dry times. Shorebirds visit water-holding scour holes. Bald eagles circle in the winter and wild turkeys gobble in spring.

"Probably our number-one use of the area is mushroom hunting, followed by deer hunting," said Frank Drummond, MDC wildlife management biologist. "The morels do really well in those river bottoms."

MDC maintains 12 miles of trails on levees and through the woods. Some field openings are maintained for plant and wildlife diversity. The Marion Access provides a boat ramp where Moniteau Creek enters the Missouri River.

Richard Elder of California and Joe McKee of Marion have fished and boated on the river for decades. The ramp is far better than the old days when they had to slide boats over a levee.

"Our kids and grandkids grew up going out with us on the river," Elder said, as they launched this summer to run trotlines.



Marion Access



Frost Island Conservation Area

bottomland timber, restored grasslands, and fields.

A visitor center and education stations along the main access road explain the area's history and ecology, which still includes periodic flooding. Columbia Bottom borders the St. Louis metro's northern neighborhoods and is only 25 miles from the city's downtown.

"We tell visitors they need to go look at the confluence; it's unique," said Andy Tappmeyer, MDC wildlife management biologist. "Columbia Bottom provides a unique destination for a lot of folks."

Canoeists and kayakers enjoy launching at a boat ramp on the Missouri River, floating through the confluence, and taking out on a sandbar on the Mississippi. Anglers also enjoy fishing on the sandbar. A parking lot and short trail provide access.

In autumn, duck hunters can draw for wade-and-shoot hunting opportunities in the wetland pools. Dove and squirrel hunting are popular. A managed youth turkey hunt is offered in the spring. Off the Mississippi shore is the 110-acre Duck Island, which has a bald eagle nest.

"We see eagles all winter long," Tappmeyer said, "and sometimes all year,

depending on where that pair is staying. A lot of folks just come out for a walk and the wildlife viewing." ▲

Bill Graham is MDC's Kansas City Region media specialist. He's a lifelong hunter, angler, and camper who also enjoys hiking and photography in Missouri's wild places.



Columbia Bottoms Conservation Area offers big rivers, wetlands, trails, and a place where everyone from hikers to school groups can connect with nature.

Columbia Bottom Conservation Area

Get Outside

in AUGUST

→ Ways to connect with nature



SOUTHWEST REGION

Dove Hunting Basics

Saturday, Aug. 18 • 8:30-11:30 a.m.

Andy Dalton Shooting Range

4897 N. Farm Road 61, Ash Grove, MO 65604

Registration required. Call 417-742-4361 by Aug. 18

Ages 10 and older

Join us to learn the most effective methods for dove hunting. We will discuss the biology of the bird and teach you how to wingshoot using techniques from Effective Wingshooting for the Hunter. We will discuss using decoys and how to use concealment to your benefit.



Leaving the Den

Watch for young **striped skunks** out and about. They are leaving the den and striking out on their own.



It's a Bird, It's a Plane ...

It's a bat! Baby bats begin taking flight. Look for these nocturnal mammals at dusk as they hunt for insects.



Natural Events to See This Month

Here's what's going on in the natural world.



Sumac fruits, hawthorn fruits, wild grapes, and elderberries ripen



Greater yellowlegs

Shorebirds begin migrating south



Young gray squirrels search for home territories



Birds of a Feather

Look for flocks of **purple martins** as they gather for migration.



Enjoy the Night Sky

Perseid meteor shower

peaks Aug. 12. How many shooting stars and constellations can you see?

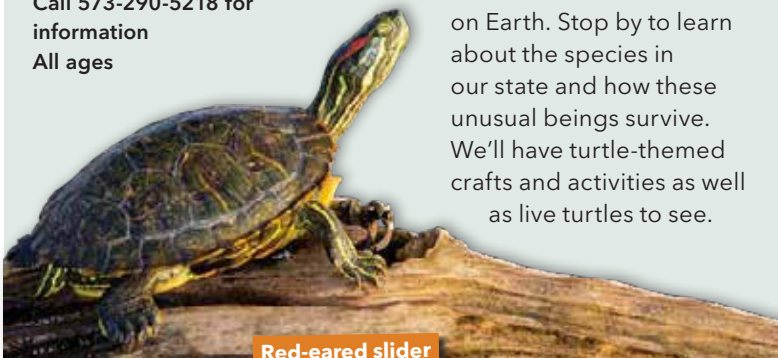
SOUTHEAST REGION

Turtle Mania

Saturday, Aug. 18 • 1-4 p.m.
Cape Girardeau Conservation
Nature Center
2289 County Park Drive,
Cape Girardeau, MO 63701
No registration required.
Call 573-290-5218 for
information
All ages

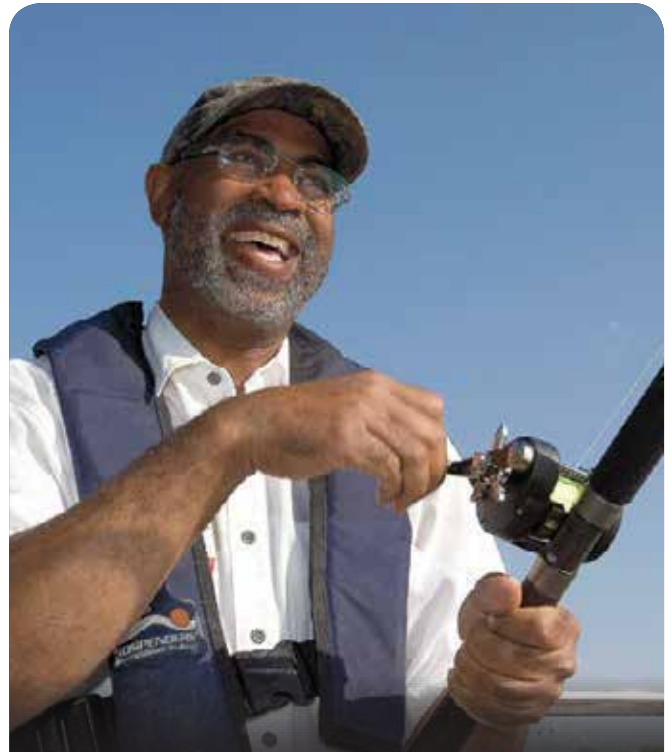


Alligator
snapping turtle



Red-eared slider

Join us for a turtle-tastic time! Shelled, clawed, and scaled, turtles are some of the oldest creatures on Earth. Stop by to learn about the species in our state and how these unusual beings survive. We'll have turtle-themed crafts and activities as well as live turtles to see.



ENJOY MORE TIME HERE

Ever have a lost or forgotten permit spoil your outdoor plans? Not anymore. MDC's permits system lets you buy online, print your permit at home, and have it in hand immediately. You can even reprint the permit if you lose or damage it.

Buy your permits online at
mdc.mo.gov/permits



Serving nature and you®



Places to Go

KANSAS CITY REGION

Hi Lonesome Prairie Conservation Area

Area rewards birders pursuing the prairie's early birds

by Larry Archer

✱ If the early bird gets the worm, then it should surprise no one that the early bird-watcher at Hi Lonesome Prairie Conservation Area (CA) would likewise be rewarded.

For birders, the “worm” would be the upland sandpiper, an uncommon find outside Missouri’s remnant prairies, said Wildlife Management Biologist Joe Coy, Hi Lonesome Prairie CA manager. In addition to the sandpiper, the 655-acre area in Benton County also hosts a number of other species.

“We have a whole suite of other bird species that use the prairie,” Coy said. “We’ve got a lot of grasshopper sparrows, Henslow’s sparrows, and loggerhead shrikes.”

Named for the customary greeting of cowboys working the wide-open prairies of centuries past, Hi Lonesome Prairie CA’s open grassland attracts many Neotropicals and other migratory species, Coy said. Controlled burning and grazing keeps the area reminiscent of the habitat that once covered most of western Missouri.

And what does the not-so-early bird-watcher get? Hot and sunburned in this nearly shadeless habitat, so Coy suggests arriving early.

“Definitely morning times, the birds — everything — will be way more active, and it’s a lot more pleasant,” he said. “It gets hot out there in the middle of summer.”



WHAT
TO
LOOK
FOR
WHEN
YOU
VISIT



Coyote



Upland sandpiper



Cup plant

While many prairie flowers are past their peak by the heat of August, the sunrise finds Missouri native tall thistle in full bloom.



HI LONESOME PRAIRIE CONSERVATION AREA

consists of 655 acres in Benton County. From Cole Camp, take Highway 52 west 1 mile, and then Klink Avenue north ½ mile.

N38° 28' 26.07" | W93° 13' 59.94"

short.mdc.mo.gov/Zqm 660-530-5500

WHAT TO DO WHEN YOU VISIT



Bird-Watching Included in the National Audubon Society's Cole Camp Prairies Important Bird Area. The eBird list of birds recorded at Hi Lonesome Prairie CA is available at short.mdc.mo.gov/ZqP.



Hunting Deer

Deer regulations are subject to annual changes. Please refer to the *Fall Deer and Turkey* booklets for current regulations. Also dove, quail, and rabbit.

"Something we see pretty regularly are **prairie kingsnakes**. About every species of prairie snake that you can think of for the most part that's native to central Missouri, they're pretty much there."

—Hi Lonesome Prairie CA Manager
Joe Coy



Dickcissel



Field sparrow



Prairie kingsnake





Plain Pocketbook

Lampsilis cardium

Status

Widespread,
common

Size

Adult length:
4-7 inches

Distribution

Almost statewide, except for river
systems far north and northwest



Did You Know?

Mussels are excellent indicators of water quality because they are long-lived and relatively immobile. They accumulate contaminants from pollution.

The plain pocketbook mussel is found in nearly every major river system and creek in Missouri. This large, moderately thick, rounded mussel prefers gravel, sand, cobble, or nearly any substrate in a quiet current. This species was important in the button industry. In Missouri, button factories opened in Mississippi River towns, like Hannibal and Louisiana, where mussel beds were prevalent. Eventually, pollution and overharvest reduced the mussel populations and the industry came to an end.



LIFE CYCLE

Males release sperm directly into the water, and females downstream siphon it into the gill chamber, where eggs are fertilized. Eggs mature into larvae (called glochidia). These discharge into the water and attach to host fish, like white crappie, sauger, bluegill, yellow perch, and others. The tiny mussels eventually break away and float to the bottom of the stream, and the cycle repeats.



FOODS

Feeds on algae and fine particles of decaying organic matter, and gets nutrients and oxygen from water drawn into the body through a specialized gill called the incurrent siphon.



ECOSYSTEM CONNECTIONS

Mussels act as nature's "vacuum cleaners," filtering and cleansing polluted waters. They are also an important food source for other species in the aquatic environment.

CLIFF WHITE

Outdoor Calendar

✱ MISSOURI DEPARTMENT OF CONSERVATION ✱



FISHING

Black Bass

Impounded waters and non-Ozark streams:
Open all year

Most streams south of the Missouri River:
May 26, 2018–Feb. 28, 2019

Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2018

Nongame Fish Gigging

Impounded Waters, sunrise to sunset:
Feb. 1–Sept. 14, 2018

Streams and Impounded Waters,
sunrise to midnight:
Sept. 15, 2018–Jan. 31, 2019

Paddlefish

On the Mississippi River:
Sept. 15–Dec. 15, 2018

Trout Parks

Catch-and-Keep:
March 1–Oct. 31, 2018

Catch-and-Release:
Nov. 9, 2018–Feb. 11, 2019



Free MO Hunting and MO Fishing Apps

MO Hunting makes it easy to buy permits, electronically notch them, and Telecheck your harvest. MO Fishing lets you buy permits, find great places to fish, and ID your catch. Get both in Android or iPhone platforms at short.mdc.mo.gov/Zi2.

HUNTING

Bullfrogs, Green Frogs

June 30 at sunset–Oct. 31, 2018

Coyote

Restrictions apply during April, spring turkey season, and firearms deer season.

Open all year

Crow

Nov. 1, 2018–March 3, 2019

Deer

Archery:

Sept. 15–Nov. 9, 2018

Nov. 21, 2018–Jan. 15, 2019

Firearms:

► Early Youth Portion (ages 6–15):
Oct. 27–28, 2018

► November Portion:
Nov. 10–20, 2018

► Late Youth Portion (ages 6–15):
Nov. 23–25, 2018

► Antlerless Portion (open areas only):
Nov. 30–Dec. 2, 2018

► Alternative Methods Portion:
Dec. 22, 2018–Jan. 1, 2019

Dove

Sept. 1–Nov. 29, 2018

Groundhog (woodchuck)

May 7–Dec. 15, 2018

Pheasant

Youth (ages 6–15):

Oct. 27–Oct. 28, 2018

Regular:

Nov. 1, 2018–Jan. 15, 2019

Quail

Youth (ages 6–15):

Oct. 27–Oct. 28, 2018

Regular:

Nov. 1, 2018–Jan. 15, 2019

Rabbit

Oct. 1, 2018–Feb. 15, 2019

Sora, Virginia Rails

Sept. 1–Nov. 9, 2018

Squirrel

May 26, 2018–Feb. 15, 2019

Teal

Sept. 8–23, 2018

Turkey

Archery:

Sept. 15–Nov. 9, 2018

Nov. 21, 2018–Jan. 15, 2019

Firearms:

► Fall: Oct. 1–31, 2018

Waterfowl

See the Waterfowl Hunting Digest or visit short.mdc.mo.gov/ZZx for more information.

Wilson's (Common) Snipe

Sept. 1–Dec. 16, 2018

Woodcock

Oct. 15–Nov. 28, 2018

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code of Missouri* at short.mdc.mo.gov/Zib. Current hunting, trapping, and fishing regulation booklets are available from local permit vendors or online at short.mdc.mo.gov/ZZf.



**Follow us
on Instagram**

@moconservation

Pipevine swallowtail butterflies (*Battus philenor*) feed along a sandbar on the Eleven Point River in the heart of the Ozarks. Adult pipevines gather in moist areas to sip essential nutrients.

📷 by **Noppadol Paothong**